

# Tunable Single Frequency UV Laser, Phase I

Completed Technology Project (2018 - 2019)



## Project Introduction

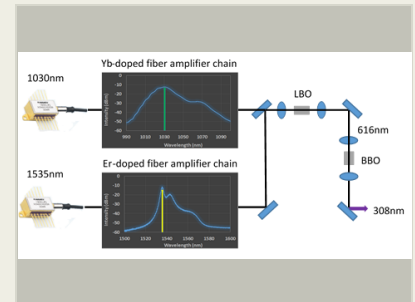
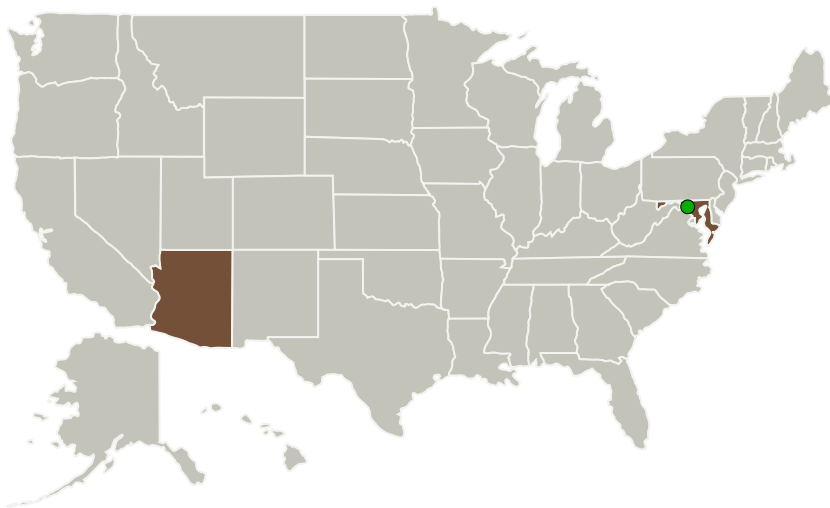
Compact and rugged single-frequency pulsed UV lasers are needed for measurement of ozone and the hydroxyl radicals (OH). The determination of the concentration of OH in the atmosphere is central to the understanding of atmospheric photochemistry. The goal for this SBIR Phase program is to demonstrate and build a highly robust high-power fast-tuning single frequency pulsed UV laser near 308nm for OH IPDA lidar measurement by using high average power and high peak power single frequency fiber lasers. The UV laser will exhibit a pulse energy of greater than 100uJ, pulse width of 5~10ns, and beam quality less than 1.3. We will build a deliverable prototype UV laser for NASA.

## Anticipated Benefits

UV laser is needed for measurement of ozone and the hydroxyl radicals (OH). The determination of the concentration of OH in the atmosphere is central to the understanding of atmospheric photochemistry. This proposed tunable narrow linewidth laser near 308nm can be used for integrated path differential absorption (IPDA) lidar for OH measurement.

This tunable single frequency UV lasers can be used to build commercial lidar for gas monitoring applications, for optical sensing, and scientific research.

## Primary U.S. Work Locations and Key Partners



Tunable Single Frequency UV Laser, Phase I

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Organizations Performing Work	Role	Type	Location
AdValue Photonics, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Tucson, Arizona
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

## Primary U.S. Work Locations

Arizona	Maryland
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## Project Transitions

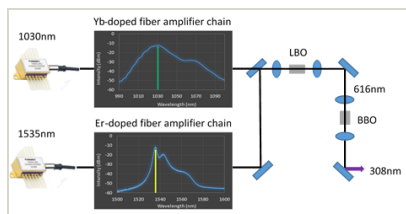
▶ **July 2018:** Project Start

✓ **February 2019:** Closed out

## Closeout Documentation:

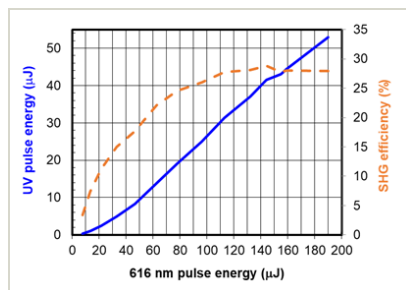
- Final Summary Chart(<https://techport.nasa.gov/file/139395>)

## Images



## Briefing Chart Image

Tunable Single Frequency UV Laser, Phase I  
(<https://techport.nasa.gov/image/127923>)



## Final Summary Chart Image

Tunable Single Frequency UV Laser, Phase I  
(<https://techport.nasa.gov/image/126121>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

AdValue Photonics, Inc.

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

Carlos Torrez

## Principal Investigator:

Shibin S Jiang

## Co-Investigator:

Shibin Jiang

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## Technology Maturity (TRL)

Start: **2**  
Current: **3**  
Estimated End: **3**



## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.5 Lasers

## Target Destination

Earth